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(54) **Handle brake device**

(57) The invention concerns a handle brake device (10) installed on a handlebar (11) of a wheelchair or a wheeled walker to control a transmission cable connected at one end to the hand brake device (10) and at the other end to a brake mechanism mounted on a wheel of the wheelchair or the wheeled walker comprising:

- a housing (1) being fixedly mounted onto the handlebar (11) of the wheelchair or the wheeled walker,
- a brake lever (2) rotatably installed on said housing (1),
- a transmission cable connected to said brake lever (2) through a cable connector (4), said cable connector (4) defining a connecting point,

characterized in that the brake lever (2) comprises a

first arc hole (16) and a second arc hole (17), inside each of which a pivot pin (13', 13'') fixedly connected to said housing (1) is slideably engaged in such a manner as to provide dual pivot for the brake lever (2), respectively a first pivot (A) and a second pivot (B), each arc hole (16, 17) having a lower end (16', 17') and a higher end (16'', 17'') and being configured so that said brake lever (2) rotates firstly around said first pivot (A) when said first pivot (A) is positioned at the lower end (16') of the first arc hole (16) and said second pivot (b) is positioned at the higher end (17'') of the second arc hole (17), and secondly around said second pivot (B) when said first pivot (A) is positioned at the lower end (16') of the first arc hole (16) and said second pivot (B) is positioned at the lower end (17') of the second arc hole (17).

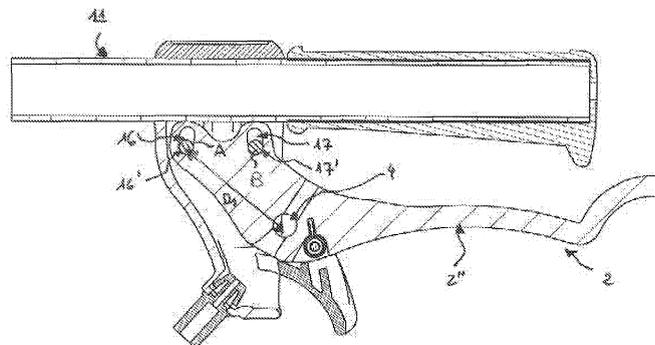


Fig. 4

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a handle brake device installed on a handlebar of a wheelchair or a wheeled walker to control a transmission cable connected at one end to the handle brake device and at the other end to a brake structure mounted on a wheel of the wheelchair or the wheeled walker.

BACKGROUND OF THE INVENTION

[0002] Wheelchairs or wheeled walkers have been widely used for aged or disabled people as a convenient vehicle. In many wheelchairs or wheeled walkers a brake is provided for emergency. Conventionally, the operator grasps a brake lever to pivot with respect to handlebar for effecting a brake. The pivot movement of the brake lever induces a stretching movement of the transmission cable connected at one end to the brake lever. Finally, the stretching movement of the transmission cable modifies the position of a brake mechanism mounted on a wheel of the wheelchair or the wheeled walker so as to reduce the speed or stop the wheelchair or the wheeled walker.

[0003] In the conventional handle brake devices, the brake lever is pivotally attached to a housing about a single pivot and the transmission cable is attached through a connector to the brake lever. Accordingly, the connecting position between the transmission cable and the brake lever remains fixed relative to the single pivot. Therefore, in these conventional devices, the movement of the transmission cable is not differentiated according to various operational positions of the brake lever. Considering that the resistance of the transmission cable is often higher at the end of the braking, when the brake lever is close to the handlebar, than at the beginning of the braking, when the brake lever is distant from the handlebar, it is often difficult, especially for ladies with small hands, to transmit a sufficient force on the brake lever permitting to stop completely the wheelchair.

[0004] One solution to this problem consists to modify the position of the connecting point of the transmission cable with regard to the pivot of the brake lever during the braking. Indeed, by modifying the position of the connecting point, it is possible to adapt the distance between the connecting point and the pivot in relation to the position of the brake lever. Therefore, by keeping constant the traction force of the operator on the brake lever and by reducing the distance between the connecting point and the pivot, the stretching force exerted on the transmission cable should be higher. Such a solution can be found for instance in the patent US-5,279,179. The brake device for bicycle, revealed by this prior art, uses a force transmission ratio adjusting means for moving the connecting point of the transmission cable toward, and away from, the brake lever pivot. However, this solution is rel-

atively complex and imposes the use of a specific cable connector.

[0005] The aim of the present invention is therefore to provide a handle brake device permitting to adapt the distance between the connecting point and the pivot in relation to the position of the brake lever, said device being simple to manufacture and easy to be manipulated.

SUMMARY OF THE INVENTION

[0006] In this view the present invention is concerned with a handle brake device as claimed in claim 1.

[0007] Important features of the device are defined in the dependant claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other features and advantages of the present invention will appear more clearly from the detailed description of embodiments of the invention which are presented solely by way of a non-restricted example and illustrated by the attached drawings in which:

Figure 1 is a front sectional view of a handle brake device of the present invention connected to a handlebar of a wheelchair, in a non-brake position;
 Figure 2 is a front sectional view of the bottom housing of the handle brake device of Figure 1;
 Figure 3 is a front sectional view of the brake lever of the handle brake device of Figure 1;
 Figure 4 is a front sectional view similar to Fig. 1 but in a first braking position;
 Figure 5 is a front sectional view similar to Fig. 1 but in a second braking position.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0009] In reference to Figure 1, a handle brake device for a wheelchair according the present invention is shown.

[0010] The handle brake device 10 of the present invention mainly includes a housing 1 fixedly connected to a handlebar 11 of the wheelchair, in close proximity to a handlebar grip 12 fixed at the end of the handlebar 11, said housing 2 comprising a bottom housing 1' positioned under said handlebar 11 and a top housing 1'' positioned over said handlebar 11, a brake lever 2 pivotally connected to said bottom housing 2' and a transmission cable (not shown) which includes a sleeve portion and a steel cable. One end of the sleeve portion is inserted inside a first hole 3' of a cable guide 3 mounted onto the bottom housing 2' and the steel cable goes across a second hole 3'' of said cable guide, said second hole 3'' extending between said first hole 3' and a distal end of said cable guide 3 positioned inside said housing 1. The steel cable is connected at one end to a cable connector 4 disposed inside said brake lever 2. Accordingly, an aperture 5 (see

Figure 2) is formed in the lower part of the bottom housing 1' to permit the introduction of a connecting means 3'' provided at the distal end of said cable guide 3. Said connecting means 3'' can consist in two flexible wings extending obliquely along said cable guide 3 which be folded so as to permit the introduction of said distal end through said aperture 5. A through hole 6 is also formed in the brake lever 2 to permit the crossing of the steel cable through the brake lever 2.

[0011] In reference to Figure 2, the bottom housing 1' of the handle brake device 10 of Figure 1 is shown. Said bottom housing 1' has a through passage 7 formed at its upper end for the handlebar 11 of the wheelchair to partially extend therethrough. Said bottom housing 1' also defines a working space 8 in a lower portion thereof below said through passage 7. A pair of holes 9' and 9'' are formed on two side walls of said bottom housing 1', said holes 9' and 9'' being positioned in the upper part of the working space 8 and being approximately equidistant from the through passage 7. A pair of pivot pins 13' and 13'' (as shown in Figure 1) may be extended through said holes 9' and 9'' to pivotally connect the brake lever 2 to the bottom housing 1', such that said brake lever 2 may be turned about said pivot pins 13' and 13'' to move upward and downward relative to the handlebar 11.

[0012] In reference to Figure 3, the brake lever 2 of the handle brake device 10 of Figure 1 is shown. This brake lever 2 has a connecting portion 2' on one end and a handle portion 2'' on the other end. The handle portion 2'' is contoured to fit one hand with a knob 14 near its extreme end to prevent slipping when in use. The handle portion 2'' is also contoured to fit to a complementary form 15 of the handlebar grip 12 (as shown in Figure 1) when the brake lever 2 is in its final braking position. This brake lever 2 also contains in an upper part of the connecting portion 2' a first arc hole 16 and a second arc hole 17, said holes 16 and 17 being configured to receive respectively the first pivot pin 13' and the second pivot pin 13'' in such a manner as to provide dual pivot for the lever, respectively a first pivot A and a second pivot B (as shown in Figure 1). This arrangement completely captivates the lever 2, while allowing a dual movement within. Each arc hole 16, respectively 17, is defined by a lower end 16', respectively 17', and a higher end 16'', respectively 17'', the higher end 16'', respectively 17'', being closer to the handlebar 11 than the lower end 16', respectively 17'. The first arc hole 16 describes approximately an arc around the second pivot B when said second pivot B is positioned at the lower end 17' of the second arc hole 17 and the second arc hole 17 describes approximately an arc around the first pivot A when said first pivot A is positioned at the lower end 16' of the first arc hole 16.

[0013] In reference to Figure 4, it is shown the position of the brake lever 2 when the handle portion 2'' is manually rotated toward the handlebar 11 of the wheelchair. The brake lever 2 has pivoted on the first pivot A positioned at the lower end 16' of the first arc hole 16. Therefore, the second pivot B moved from its initial position at

the higher end 17'' of the second arc hole 17 to its final position at the lower end 17' of the second arc hole 17. In this first braking step, the connecting point 4 rotates on the first pivot A. The distance between said connecting point 4 and said first pivot A is D1.

[0014] In reference to Figure 5, it is shown the position of the brake lever 2 when the handle portion 2'' is further rotated toward the handlebar 11 of the wheelchair. The brake lever 2 has pivoted on the second pivot B positioned in the lower end 17' of the second arc hole 17. Therefore, the first pivot A moved from its initial position at the lower end 16' of the first arc hole 16 to its final position at the higher end 16'' of the first arc hole 16. In this second braking step, the connecting point 4 rotates on the second pivot B. The distance between said connecting point 4 and said second pivot B is D2. Considering that D2 is less than D1, the operator provided less effort during the second braking step than in the first braking step.

Claims

1. Handle brake device (10) installed on a handlebar (11) of a wheelchair or a wheeled walker to control a transmission cable connected at one end to the hand brake device (10) and at the other end to a brake mechanism mounted on a wheel of the wheelchair or the wheeled walker comprising:

- a housing (1) being fixedly mounted onto the handlebar (11) of the wheelchair or the wheeled walker,
- a brake lever (2) rotatably installed on said housing (1),
- a transmission cable connected to said brake lever (2) through a cable connector (4), said cable connector (4) defining a connecting point,

characterized in that the brake lever (2) comprises a first arc hole (16) and a second arc hole (17), inside each of which a pivot pin (13', 13'') fixedly connected to said housing (1) is slideably engaged in such a manner as to provide dual pivot for the brake lever (2), respectively a first pivot (A) and a second pivot (B), each arc hole (16, 17) having a lower end (16', 17') and a higher end (16'', 17'') and being configured so that said brake lever (2) rotates firstly around said first pivot (A) when said first pivot (A) is positioned at the lower end (16') of the first arc hole (16) and said second pivot (b) is positioned at the higher end (17'') of the second arc hole (17), and secondly around said second pivot (B) when said first pivot (A) is positioned at the lower end (16') of the first arc hole (16) and said second pivot (B) is positioned at the lower end (17') of the second arc hole (17).

2. Handle brake device (10) according to claim 1

wherein the distance (D2) separating the lower end (17') of the second arc hole (17) and the connecting point (4) is less than the distance (D1) separating the lower end (16') of the first arc hole (16) and the connecting point (4).

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- 3. Handle brake device (10) according to any one of the preceding claims, wherein the first arc hole (16) describes approximately an arc around the second pivot (B) when said second pivot (B) is positioned at the lower end (17') of the second arc hole (17) and the second arc hole (17) describes approximately an arc around the first pivot (A) when said first pivot (A) is positioned at the lower end (16') of the first arc hole (16).

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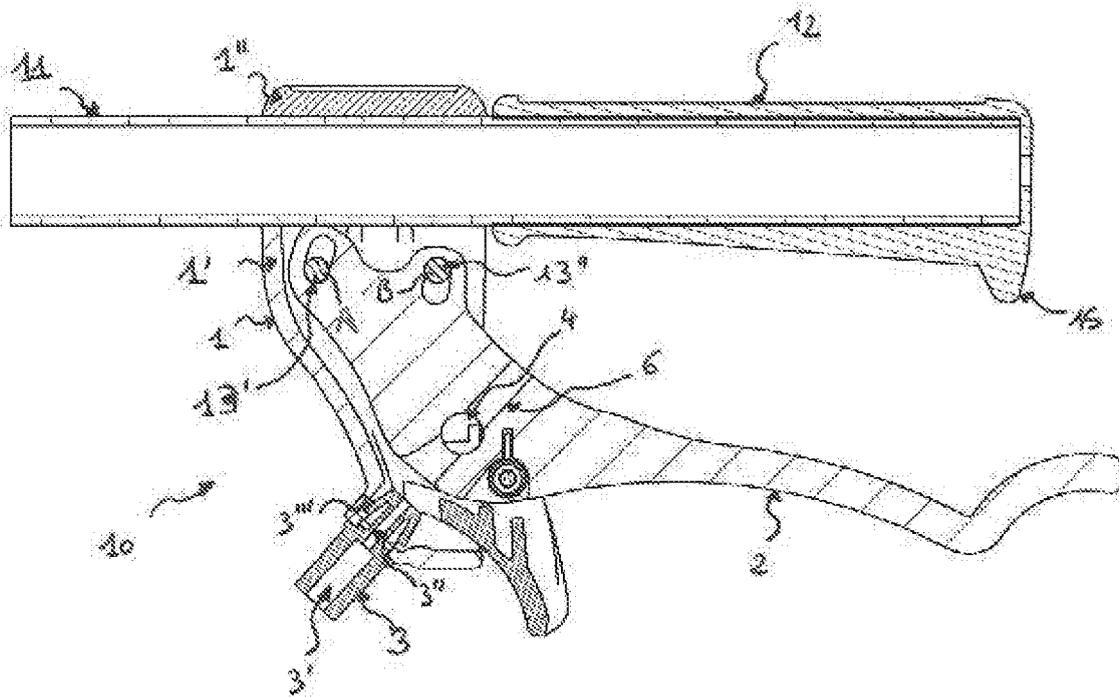


Fig. 1

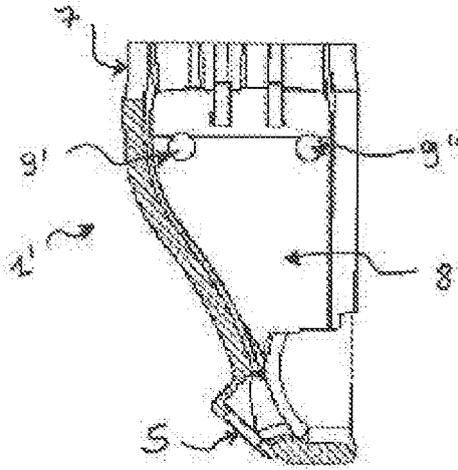


FIG. 2

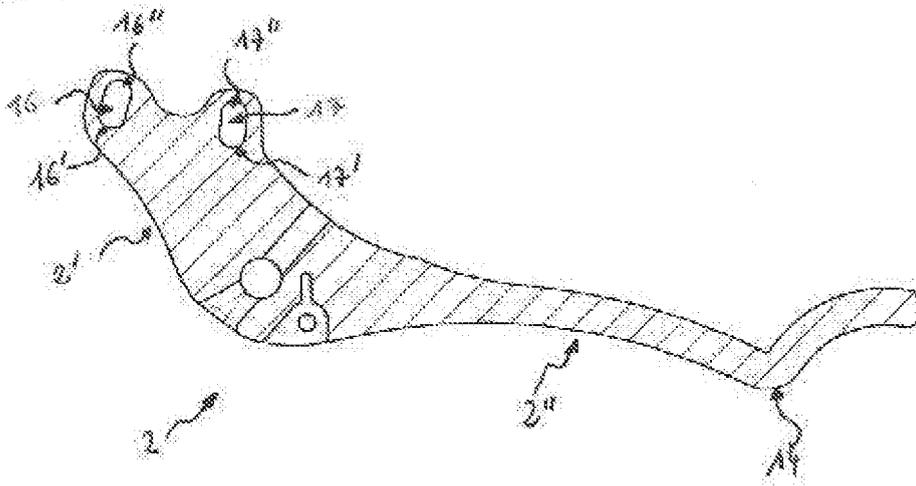


FIG. 3



EUROPEAN SEARCH REPORT

 Application Number
 EP 09 17 2223

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Place of search Munich		Date of completion of the search 26 November 2009	Examiner Jung, Wolfgang
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